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As a basis for meaningful comparisons of graduate training in the United States and in the Soviet Union, the authors briefly review the Soviet system of higher education. The report offers the following comparative data on graduate education in the two countries: number of graduate students, 1960; graduate enrollments by fields of study, 1960; and number of degrees earned 1950–59. It also lists the types of institutions offering graduate training in the Soviet Union.

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Graduate Education in the U.S.S.R.

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U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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Graduate Education in the U.S.S.R.

Contrasts with Advanced Study in the U.S.

By Clarence B. Lindquist and Nicholas J. Rokitiansky

IN HIS comprehensive and voluminous study *Education and Professional Employment in the U.S.S.R.*, Nicholas De Witt, formerly at the Russian Research Center of Harvard University and now at Indiana University, analyses and discusses in detail all levels of Soviet higher education from the pre-Soviet era to 1960.[1] In addition to describing educational programs in the U.S.S.R., he presents data on degrees and enrollments in various fields of specialization and, when feasible, makes comparisons between the U.S. and the U.S.S.R. For example, of 366,000 bachelor's and first professional degrees granted in the U.S. in 1957–58 and 338,000 "diplomas" in the U.S.S.R. in 1959, only 87,700, or 23.9 per cent, were in engineering, science, and applied science in the U.S., whereas 191,000 or 56.6 per cent were in these fields in the U.S.S.R.[2]

Quantitative comparisons of numbers of graduates and especially of enrollments by specific fields at the upper level of higher education have been more difficult to make. Fortunately, two publications appeared in 1961 which permit meaningful comparisons. One is the *Summary Report on Survey of Students Enrolled for Advanced Degrees: Fall 1960*,[3] and the other is *Vysshee Obrazovanie v S.S.S.R.: Statisticheskii Sbornik* ("Higher Education in the U.S.S.R.: Compilation of Statistics").[4]

The *Summary Report* is the second of a series of nation-wide surveys of students enrolled for advanced degrees in which graduate enrollments are broken down as follows: first-year students who have completed less than one full year of required work for an advanced degree; intermediate students who have completed one or more years of required work for an advanced degree and are not expected to finish all requirements for a doctor's degree by June 30 of the following year; and terminal-year students for the doctorate. The Soviet statistical book gives enrollments and the number of students who completed training in the U.S.S.R. at each level for several years, including the year 1960.

[1]Washington, D.C.: National Science Foundation, 1961.
[2]*Ibid.*, p. 341.
[3]Wayne E. Tolliver (Washington, D.C.: Office of Education, 1961).
[4]Moscow: Gosstatizdat TS.S.U. S.S.S.R., 1961.

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IN ORDER to form a basis on which to make meaningful comparisons, it will be necessary to review the Soviet system of higher education. In the U.S.S.R. the course of study lasts between five and six years, and those who complete it successfully receive a diploma.[5] In view of the requirement in practically all programs that there be some periods of part-time study and others of full-time employment, it is reasonable to consider this diploma equivalent to the American bachelor's degree plus one additional year of graduate study. (Opinions differ concerning the quality of Soviet degrees as compared with American degrees, but it is not the intent of this writer to engage in that controversy.) The "diploma" (*diplom*) degree is terminal for most students in Soviet higher education. Next in rank is the degree of "candidate of science" (*kandidat nauk*), which can be attained in three years of graduate study by full-time students (*ochnaia aspirantura*) and in four years by part-time students (*zaochnaia aspirantura*),[6] though it usually requires a longer period of time. In Soviet usage, the term "science" (*nauka*) is synonymous with "knowledge" and embraces all disciplines.

To work toward a "candidate" degree, a student may enroll at a higher educational institution or a scientific-research institute as a graduate student ("aspirant"). He follows a program which includes seminars in his field of specialization, led by the professorial teaching staff, and in such political courses as History of the Communist Party, Political Economy, Marxism, and Leninism; independent study in his major and minor fields of specialization; preparation for foreign-language examinations; experimental work, especially in connection with his dissertation; and attendance in remedial classes if necessary.

All aspirants must pass minimum examinations (*kandidatskii minimum*), which in some degree correspond to our doctoral preliminary or qualifying examinations. Passing these examinations is, in fact, necessary to the successful completion of *aspirantura* training. To receive the degree of candidate, however, the student must write and defend a research dissertation. As the result of new regulations established in 1960, the research findings must be published at least three months prior to the defense of the dissertation. However, it is not necessary to take *aspirantura* training in order to qualify for a candidate degree. Over the years, according to De Witt, only about half of the recipients of candidate degrees have taken formal *aspirantura* training.

In the U.S.S.R. there is also a degree "doctor of science" (*doktor nauk*),[7] which is higher than that of candidate. The doctor of science degree may be awarded after the successful defense of a dissertation of very high quality and merit or as an honorary degree, *honoris causa*, without the defense of a dissertation, to Soviet and foreign members of the Academy

[5] De Witt, *op. cit.*, p. 277.
[6] *Pedagogicheskii Slovar'* ("Pedagogical Dictionary"), Vol. I (Moscow: Izdatel'stvo Akademii Pedagogicheskikh Nauk, 1960), pp. 63–64; 395–97.
[7] *Ibid.*, p. 348.

of Science of the U.S.S.R.[8] According to De Witt, an average of only 543 doctor of science degrees a year were awarded during the period 1937–59.[9]

According to A. V. Topchiev, vice-president of the Academy of Science of the U.S.S.R., experience has shown that the defense of the doctoral dissertation after the candidate degree has been awarded ordinarily takes twelve years, the average age of the recipients of doctor of science degrees being about forty-nine.[10] Topchiev states that of the 354,000 scientific workers in all modern branches of science and the arts in the U.S.S.R. in 1961, 98,000 have candidate degrees and 11,000 doctorates.

THE rules for admission to graduate study in Soviet higher schools and scientific-research institutes are specified in the 1961 edition of the handbook on graduate training.[11] No one who is over the age of thirty-five is admitted as a full-time aspirant; no one over forty-five can become a part-time aspirant. Aspirants must possess diplomas, must have demonstrated ability to do scientific research, and in general must have had not less than two years of practical experience in industry, in teaching, or in scientific work. Outstanding students may be exempted from the work-experience requirement.

According to the August 10, 1962, issue of *Pravda*, a new statute has been promulgated which requires that the Union Republics provide special-purpose graduate studies. A one-year graduate program is to be organized at higher educational institutions and is to admit not only instructors in higher institutions but also teachers in general-education secondary schools who are not older than forty-five. Persons recommended by educational institutions, industrial enterprises, collective farms, state farms, and other organizations of the Union Republics are to be admitted without competitive examination.

In 1960, 394 institutions of higher education were authorized to conduct *aspirantura* training. The types and number of institutions are shown in Table I. In addition, *aspirantura* training was authorized in 363 scientific-research institutes, of which 160 were under the jurisdiction of the All Union and 203 under the jurisdiction of the Soviet republics.[12] Thus, 757 different institutions are permitted to give graduate education. Not included in this tabulation are military institutions of higher learning.

The geographical distribution of *aspirantura* training is interesting

[8] *Aspirantura: Spravochnik Dlia Postupaiushchikh v Aspiranturu i Soiskatelei Uchebnykh Stepenei* ("Graduate Training: Manual for Graduate Students Enrolled for Graduate Training and Advanced Academic Degrees"), compiled by A. M. Ermoliuk and V. I. Smyslov (Moscow: Gosudarstvennoe Izdatel'stvo, Vysshaia Shkola, 1960), p. 366.

[9] De Witt, *op. cit.*, p. 403.

[10] "O Sostoianii i Podgatovke Nauchnykh Kadrov v Svete Novykh Zodach Akademii Nauk S.S.S.R." ("About the Standards and Training of Scientific Personnel in the Light of New Aims of the Academy of Science of the U.S.S.R."), *Vestnik Akademii Nauk S.S.S.R.*, ("Review of the Academy of Science of the U.S.S.R."), Vol. 12, 1961, pp. 36–46.

[11] *Obzornyi Spravochnic Vysshikh Uchebnykh Zavedenii* ("Handbook—Survey for Institutions of Higher Learning"), compiled by I. P. Kleshchenok and K. V. Bakhtiarova (Moscow: Vsesoiuznaia Knizhnaia Palata, 1961), pp. 302–10, and *Aspirantura*, *op. cit.*, pp. 6–16.

[12] *Aspirantura*, *op. cit.*, pp. 312–50.

to observe. In 1960, 185 of the 757 higher schools and research institutes in the U.S.S.R. were located in Moscow; 81, in Leningrad. The considerable increase in the number of institutions offering graduate training in the Urals, Siberia and the Far Eastern area (79), as well as in Kazakhstan and Central Asia (49), indicates the growing emphasis on graduate training on the periphery of the Soviet Union, and thus the shifting of the center of gravity toward the eastern part of the U.S.S.R.[13]

TABLE I

TYPES OF INSTITUTIONS OF HIGHER EDUCATION IN THE U.S.S.R. AUTHORIZED IN 1960 TO TRAIN ASPIRANTS*

	Number
Universities	38
Polytechnic and industrial institutions	24
Power and radio engineering and engineering physics	7
Machine-building, shipbuilding, aviation, printing, and cinema engineering	23
Geology, mining, petroleum, peat, and metallurgy	23
Chemical engineering	10
Food and fish industry	10
Light industry	7
Civil engineering, geodesy, and highway construction	22
Hydrometeorology	1
Transportation and communication	19
Agriculture and forestry	52
Economics and international relations	18
Law	4
Fine and applied arts	13
Medical sciences	64
Physical culture	4
Pedagogy, library science, archive science, literature	55
Total	394

*Source: *Aspirantura: Spravochnik Dlia Postupaiushchikh v Aspiranturu i Soiskatelei Uchebnykh Stepenei* ("Graduate Training: Manual for Graduate Students Enrolled for Graduate Training and Advanced Academic Degrees"), compiled by A. M. Ermoliuk and V. I. Smyslov (Moscow: Gosudarstvennoe Izdatel'stvo, Vysshaia Shkola, 1960), pp. 237–312.

The annual plan for admission to graduate training in all higher institutions of learning and in scientific-research establishments of the ministries is considered and approved by the Ministry of Higher and Secondary Special Education of the U.S.S.R. in accordance with the demands of the national economy. The enrollment of aspirants in the scientific-research institutes within the Academy of Science in the U.S.S.R. and the various academies in the Soviet republics is considered and approved by the presidiums of the academies.[14]

The number of aspirants in 1961 in the Academy of Science of the U.S.S.R. was about 3,500, including 200 from satellite countries; in the academies of the various republics it was slightly over 3,000. The Academy of Science of the U.S.S.R. annually graduates about 200 candidates, who constitute an important source of new research personnel for the Academy.[15]

[13] *Ibid.*, pp. 417–46.
[14] *Ibid.*, pp. 7–8.
[15] Topchiev, *op. cit.*, pp. 44, 46.

IN THE number of students formally enrolled in advanced graduate work, the United States has a big lead over the Soviet Union. As compared with 36,754 students enrolled as aspirants in the U.S.S.R. in 1960, of whom 22,978 were full-time, there were 117,169 students enrolled as intermediate or terminal-year students in the U.S. in the fall of 1960, of whom 55,764 were full-time (see Table II). During the year 1960, 14,399 Soviet students were admitted to *aspirantura* training and 5,517 students completed their training.

It was pointed out earlier that only about one-half of those who earned candidate degrees in the past had been previously enrolled in *aspirantura* training. Hence it can be presumed that in the Soviet

TABLE II

COMPARATIVE NUMBERS OF GRADUATE STUDENTS IN THE U.S. AND ASPIRANTS IN THE U.S.S.R., 1960*

Educational Status of Student	Full-Time Students	Part-Time Students	Total
(1)	(2)	(3)	(4)
U.S. graduate students			
Intermediate	47,979	55,788	103,767
Terminal-year	7,785	5,617	13,402
Total	55,764	61,405	117,169†
U.S.S.R. aspirants			
In higher educational institutions	13,463	6,943	20,406
In scientific-research institutes	9,515	6,833	16,348
Total	22,978	13,776	36,754

*Source: Wayne E. Tolliver, *Summary Report on Survey of Students Enrolled for Advanced Degrees: Fall 1960* (Washington, D.C.: Office of Education, 1961), p. 3, and *Vysshee Obrazovanie v S.S.S.R. Statisticheskii Sbornik* ("Higher Education in the U.S.S.R.: Compilation of Statistics"), (Moscow: Gosstatizdat, TS.S.U. S.S.S.R., 1961), p. 219.

†In the fall of 1960 there were also 197,180 first-year graduate students in the U.S., of whom 68,925 were full-time and 128,255 were part-time students.

Union there are more than 36,754 students actually pursuing advanced study. Even allowing for this, the U.S. appears to have a substantial lead over the U.S.S.R. in the number of students in advanced graduate work. It should be noted, however, that about 63 per cent of the aspirants were full-time, whereas in the United States only about 48 per cent of the intermediate and terminal-year graduate students were full-time. In the United States a graduate student is counted as full-time if he carries at least 75 per cent of what the institution considers a normal full-time load for a graduate student.

In the Soviet Union women take a very active part in scientific-research work and teaching in higher schools and research institutes. In 1960 there were 129,000 women scientific researchers, or 36 per cent of all such specialists. Of this number, 30,000 had advanced degrees.

In 1960, 8,405, or 22.9 per cent, of the 36,754 aspirants in the U.S.S.R.

were women, as compared with 8,588, or 39.2 per cent of the 21,905 aspirants in 1950.[16] Thus, the percentage of women in the Soviet Union entering advanced graduate training appears to be decreasing.

In surveys of graduate enrollment made by the the Office of Education, data by sex were not obtained. However, of the 9,829 doctor's degrees awarded in 1959–60 in the United States, 1,028, or 10.5 per cent, were

TABLE III

GRADUATE STUDENTS IN THE U.S. CLASSIFIED ACCORDING TO FIELD OF STUDY, 1960*

FIELD OF STUDY	INTERMEDIATE AND TERMINAL-YEAR STUDENTS†			
	Full-Time	Part-Time	Per-Cent Distribution	Total‡
(1)	(2)	(3)	(4)	(5)
Agriculture	1,251	738	1.7	1,989
Architecture	162	88	0.2	250
Biological sciences	5,224	2,514	6.6	7,738
Business and commerce	2,904	4,615	6.4	7,519
Chemistry	4,119	1,868	5.1	5,987
Economics	1,332	970	2.0	2,302
Education	4,796	19,187	20.5	23,983
Engineering	6,702	10,040	14.3	16,742
English and journalism	2,675	2,514	4.4	5,189
Fine and applied arts	2,065	1,274	2.8	3,339
Foreign languages and literature	1,791	1,231	2.6	3,022
Forestry	177	58	0.2	235
Geography	302	184	0.4	486
Geology	927	427	1.2	1,354
Health professions	1,615	751	2.0	2,366
History	2,169	1,555	3.2	3,724
Home economics	286	253	0.5	539
Law	57	326	0.3	383
Library science	81	124	0.2	205
Mathematical subjects	2,115	2,200	3.7	4,315
Philosophy	783	447	1.0	1,230
Physical sciences§	595	347	0.8	942
Physics	2,985	2,248	4.5	5,233
Psychology	2,647	2,560	4.4	5,207
Religion	1,996	889	2.5	2,885
Social sciences‖	5,621	3,396	7.7	9,017
General and miscellaneous	387	601	0.8	988
Total	55,764	61,405	100.0	117,169

*Source: Wayne E. Tolliver, *Summary Report of Students Enrolled for Advanced Degrees: Fall 1960* (Washington, D.C.: Office of Education, 1961), pp. 3–6.

†Excludes such first professional degrees as M.D., D.D.S., J.D., and so on.

‡This total includes only 13,402 students, or 11.4 per cent, who are terminal-year students.

§Includes the physical sciences other than chemistry, geology, and physics.

‖Includes the social sciences other than economics and history.

awarded to women, as compared with 643 of 6,415, or 10 per cent, in 1949–50. Since it is reasonable to assume that the per cent of graduate enrollments of women would be roughly equivalent to the per cent of graduate degrees, considerably more women, relatively speaking, are enrolled in advanced graduate training in the U.S.S.R. than in the U.S.

[16] *Vysshee Obrazovanie, op. cit.*, pp. 14, 224.

THE comparative enrollments in specific fields of study in the U.S. and the U.S.S.R. are shown in Tables III and IV. Because of the difference in systems of classification and grouping of fields used in the United States and the Soviet Union, it is impossible to make exact comparisons. Nevertheless, a good idea of the relative emphasis in different fields of study in the two countries can be gained by studying these tables.

TABLE IV

ASPIRANTS IN THE U.S.S.R. CLASSIFIED ACCORDING TO FIELD OF STUDY, 1960*

Field of Study	Number in Higher Educational Institutions	Number in Scientific-Research Institutes	Per-Cent Distribution	Total
(1)	(2)	(3)	(4)	(5)
Agriculture (including forestry) and veterinary science	1,077	1,800	7.8	2,877
Architecture	25	123	0.4	148
Biological sciences	732	1,145	5.1	1,877
Chemistry	1,296	1,106	6.5	2,402
Economics (including business, commerce, and political economy)	1,661	1,115	7.6	2,776
Engineering	6,720	7,216	37.9	13,936
Fine and applied arts	314	134	1.2	448
Geography (including meteorology, oceanography, and hydrology)	254	148	1.1	402
Geology and mineralogy	533	780	3.6	1,313
History (including archaeology and some aspects of anthropology and sociology) and philosophy (including some aspects of political science)	1,184	542	4.7	1,726
Law	280	122	1.1	402
Medicine (including psychiatry) and pharmaceutical science	1,846	739	7.0	2,585
Pedagogy (including library science and general and special psychology)	691	265	2.6	956
Philology (including languages, literature, and journalism)	1,067	404	4.0	1,471
Physics (including astronomy) and mathematics	2,726	709	9.3	3,435
Total	20,406	16,348	100.0	36,754

*Source: *Vysshee Obrazovanie v S.S.S.R.: Statisticheskii Sbornik* ("Higher Education in the U.S.S.R.: Compilation of Statistics"), (Moscow: Gosstatizdat, TS.S.U. S.S.S.R., 1961), p. 222.

The Office of Education uses 22 major groupings of fields. These are the fields shown in Table III if chemistry, geology, and physics are combined with physical sciences, and history and philosophy with social sciences. However, these subfields have been given separate listing in the U.S. tabulation so that they will correspond as closely as possible to the Soviet classification in Table IV.

There are 18 major groupings of fields recognized in the U.S.S.R. According to the law of March 20, 1937, on Academic Degrees and Ranks,[17] advanced degrees can be awarded in the following fields with the number of permissible specializations in each field as of 1960: agri-

[17] *Aspirantura, op. cit.*, pp. 365–69.

culture, 16; architecture, not given; biological science, 22; chemistry, 7; economics, 55; engineering, 293; fine and applied arts, 16; geography, 14; geology and mineralogy, 24; history, 13; law, 18; medical science, 42; pedagogy, 27; pharmaceutical science, 5; philology, 35; philosophy, 5; physics and mathematics, 38; veterinary science, 14.[18] In producing the data given in Table IV, the Soviet source combined several of these fields.

Tables III and IV show that, as in the undergraduate program, the emphasis in Soviet graduate training is on basic and applied science and technology. For example, 37.9 per cent of the enrollment in the U.S.S.R. in 1960 was in engineering as compared with 14.3 per cent in the U.S. For the combined disciplines of chemistry, geology, physics, and mathematics, the per cent of the Soviet enrollment was 19.4; for the United States it was 14.5. On the other hand, whereas 20.5 per cent (the largest) was in education in the U.S., the per cent in pedagogy, which in the U.S.S.R. includes library science and general and special psychology as well as the methodology of teaching, accounted for only 2.6 per cent of all aspirants. Since the government as an official policy discredits religion, only the history of atheism and religion is taught in the Soviet Union. Nor is home economics a field of graduate study, although the economics of food preparation on a large scale, as in restaurants, and the technology of food-processing are included as specializations under economics and engineering respectively.

The social sciences (*obshchestvennye nauki*) have been rather neglected in Soviet higher education. This has become a concern even of Soviet educators. Only last year, V. P. Yelyutin, Minister of Higher and Secondary Special Education in the U.S.S.R., said that the teaching of social sciences and the training of graduate students is far from satisfactory.[19] The higher schools, particularly in the republics, lack good teaching staff for training qualified aspirants and future faculty in the field of the social sciences. Yelyutin pointed out that there have been few doctoral dissertations. From 1955 to 1960 only three doctorates in the History of the Communist Party of the Soviet Union were awarded, and none has been awarded since then. Apparently, few individuals are willing to work on such dissertations because they do not want to become involved in possible "deviation" from policy.

THE U.S. doctorate and the Soviet candidate degree are roughly equivalent, since both customarily require a minimum of three years of largely independent study, a thesis, foreign-language competency, and the passing of a qualifying examination in the area of specialization. Table V gives a comparison, year by year, of the numbers of these degrees awarded in the U.S. and the U.S.S.R. for the ten-year period 1950–1959. The year 1960 is not included because no data concerning the number

[18] *Ibid.*, pp. 94–236.

[19] "Vospityvat' Aktivnykh Boitsov Za Torzhestvo Marksizma-Leninizma" ("Developing More Active Interest in Glorifying Marxism and Leninism"), *Vestnik Vysshei Shkoly* ("Review of Higher School"), Vol. 2, 1962, pp. 32–34.

of candidate degrees were available for that year. The reader may be curious about the sharp drop from 12,842 candidate degrees in 1954 to 3,500 in 1957, followed by a rise to 5,700 (estimated) in 1959. According to De Witt, the year 1954 marked a period of low standards and laxity, followed by a renewed tightening of the standards starting in 1956.[20]

After a rise from 6,415 in 1949–50 to 8,996 in 1953–54, the number of doctorates in the U.S. did not increase until 1958–59. There is no doubt that the decline of the master's and other second-level degrees from 65,132 in 1950–51 to 56,823 in 1953–54 was the major factor in this lag.

TABLE V

COMPARATIVE NUMBER OF GRADUATE DEGREES EARNED IN THE U.S. AND THE U.S.S.R., 1950–1959*

Year†	U.S. Doctorates	U.S.S.R. Candidates
(1)	(2)	(3)
1950	6,415‡	4,536
1951	7,338	5,464
1952	7,683	5,000
1953	8,309	8,530
1954	8,996	12,842
1955	8,840	11,800
1956	8,903	7,800
1957	8,756	3,500
1958	8,942	5,000§
1959	9,360	5,700§
Total	83,542	70,172

*Source: Wayne E. Tolliver and Justin C. Lewis, *Earned Degrees Conferred: Bachelor's and Higher Degrees, 1958–59* (Washington, D.C.: Office of Education, 1961), p. 3, and Nicholas De Witt, *Education and Professional Employment in the U.S.S.R.* (Washington, D.C.: National Science Foundation, 1961), p. 399.

†Note: U.S. data are based on a year beginning July 1 and ending June 30 of the year shown. Soviet data are based on a calendar year.

There were 9,829 doctorates granted during the year 1959–60 in the U.S. The number of candidates in 1960 in the U.S.S.R. was not available.

‡Corrected figure.

§Estimate.

In addition to the successful degree candidates, a considerable number of students in both countries have completed all the formal requirements for the degree except the dissertation. Bernard Berelson estimated in 1960 that the number of ABD's (All But Dissertation) in the United States was upward of 10,000.[21] John L. Chase, using a more restricted definition, found in the same year that there were approximately 4,000 students who had completed all formal requirements except the dissertation at least three years prior to the study, and who, the graduate

[20]De Witt, *op. cit.*, p. 401.

[21]*Graduate Education in the United States* (New York: McGraw-Hill Book Company, Inc., 1960), p. 171.

deans were willing to certify, could finish their dissertations in one more year.[22]

In the U.S.S.R., according to De Witt, only about one-third of those who take and complete *aspirantura* training write and defend a dissertation within three years of full-time study. If those who take *aspirantura* training and at some later date receive a candidate degree are included, the proportion increases to about 60 per cent.[23]

IN BOTH the United States and the Soviet Union substantial efforts have been made to strengthen and expand graduate education. In the United States the number of graduate-fellowship programs, both federal and private, has increased since the end of the Second World War. New programs have come into existence because of the growing demand for persons with high-level training and the difficulty many capable students have in financing graduate education. The decreasing percentage in colleges and universities in recent years of new faculty members who hold the doctorate and the anticipated rapid expansion of college enrollments in the immediate future have been major factors in bringing about increased support of graduate education.[24]

In addition to assisting graduate students directly, some of the fellowship programs offer financial assistance to the graduate schools which enroll these students. Title IV of the National Defense Education Act (NDEA) of 1958, for example, allows the institution a maximum grant of $2,500 for each graduate student in an approved program. With the support of NDEA, institutions which did not offer doctorates in certain disciplines before are now doing so. As a result of the first two years of operation of this Act, large increases have taken place in the number of doctorate-granting institutions in certain fields of study. In chemistry, for example, the number jumped during the 1950's from 108 to 116; in engineering, from 71 to 76; in geology, from 54 to 58; in mathematics and statistics, from 75 to 87; and in physics, from 82 to 99. Since this list takes only certain fields into account, and since some institutions establish new programs without outside assistance of any kind, the figures given do not represent the total of increases. Besides NDEA, the National Woodrow Wilson Fellowship Program, the Danforth Foundation Fellowship Program, and the graduate fellowship programs of the National Science Foundation and the National Institutes of Health have been operating on a large scale for a number of years and have made a substantial contribution toward the support of graduate students.

In the Soviet Union, the decree of January, 1960, on the improvement of the quality of dissertations for advanced degrees underscores the importance of graduate education and delineates the steps that must be

[22] *Doctoral Study: Fellowships and Capacity of Graduate Schools* (Washington, D.C.: Office of Education, 1961), p. 31.

[23] De Witt, *op. cit.*, p. 399.

[24] For a description of the various graduate-fellowship programs in the United States, the reader may wish to consult *Fellowships in the Arts and Sciences: 1962–63*, by M. E. Schiltz (Washington, D.C.: Association of American Colleges, 1961).

taken to strengthen it.[25] According to the decree, under the current Seven-Year Plan (1959–65) every effort must be directed toward the rapid development of all branches of knowledge and the concentration of research in the most important fields involving its highly theoretical as well as its practical applications. Advanced academic degrees and titles are to be awarded only for high-level research containing new scientific, theoretical, or practical deductions and discoveries and for the publication of high-quality textbooks. Attention is to be given to the selection of candidate and doctor of science dissertations which relate to the demands of rapidly developing industry, transportation, agricultural economy, and the national culture in general.

The Soviet decree of January 28, 1960, required that the following actions be taken:

> 1. Assign without fail to the council of each higher institution and research establishment the responsibility for raising the standards of dissertations for advanced degrees in the humanistic studies.
>
> 2. Bring to the attention of the Academy of Pedagogical Sciences of the Russian Soviet Federated Socialist Republic (RSFSR), the higher pedagogical institutions, the research establishments, and the universities the necessity of raising the quality of dissertations for advanced degrees in the pedagogical sciences.
>
> 3. In order to improve evaluation of the scientific, theoretical, and practical applications of dissertations and of the awarding of degrees and titles, establish within the Higher Attestation Committee of the Ministry of Higher and Special Secondary Education the following sections:
>
> *a.* Physics and mathematical sciences
> *b.* Technological sciences
> *c.* Chemical sciences
> *d.* Biological, agricultural, and veterinary sciences
> *e.* Humanities
> *f.* Medical sciences
> *g.* Army and Navy section on science

In the Soviet Union, evening school and correspondence study are used as a means of securing higher education by about 52 per cent of the total number of undergraduates and about 37 per cent of all the graduate students. (In the United States the situation is reversed. The undergraduate part-time enrollment in evening-school and correspondence study in the fall of 1961 was about 30 per cent of the total, and the part-time graduate enrollment in the fall of 1960 was about 52 per cent.) Under the present Seven-Year Plan, efforts are being made to expand graduate education through an increase in the number of evening and correspondence courses.[26] Such measures as granting leave with pay to enable graduate students to complete their dissertations have become part of Soviet law. However, there is some dissatisfaction with the quality of training taking place in the evening and correspondence

[25] *Aspirantura, op. cit.*, pp. 369–72.
[26] E. V. Chutkerashvili, *Razvitie Vysshego Obrazovaniia v S.S.S.R.* ("Development of Higher Education in the U.S.S.R."), (Moscow: Gosudarstvennoe Izdatel'stvo, Vysshaia Shkola, 1961), pp. 172–73, 143.

programs.[27] The day schools, with their heavy concentration of the best teaching staff, are much better qualified to give theoretical instruction of a high quality than are the evening and correspondence schools, but the cost of training full-time students in them is greater.

One of the problems in the U.S.S.R. in connection with graduate study is the concentration of top-ability students, faculty, and research specialists at prestige institutions. In the two years 1959 and 1960, only eight of 59 students who completed their *aspirantura* training in the social sciences in Moscow and Leningrad undertook to teach in the more remote areas of the Soviet Union where there is a heavy demand for qualified faculty in institutions with little prestige and few research facilities.[28] Also the less attractive living conditions in the outlying sections of the U.S.S.R. are undoubtedly an important factor in the unwillingness of trained personnel to leave the centers of culture. Similarly, the academies of the republics lack qualified professional staff for training aspirants in the new technological subjects: 80 per cent of the new specialists in the Academy of Science of the U.S.S.R. come from the higher schools of Moscow and Leningrad.[29]

THE quality of graduate education and the number of students enrolled in advanced programs are matters of no little concern to a modern industrialized society, because the individuals who blaze the new trails on the frontiers of knowledge come largely from the graduate schools of our colleges and universities.

As the data of this article show, we have a greater number of students enrolled in advanced graduate work than do the Soviets. However, it should be noted that in the U.S. only 48 per cent of graduate students are engaged in full-time study as compared with 63 per cent in the U.S.S.R. Certainly our system of graduate education could be improved in this respect. Moreover, a greater effort should be made to increase the number of women in graduate education. On a percentage basis, we are doing less than half as well as the Soviets in recruiting women candidates for advanced degrees.

It should be observed, in conclusion, that the Soviets emphasize basic and applied science in graduate education to the relative neglect of advanced work in the social sciences and the humanities. As the erratic fluctuation in advanced Soviet degrees indicates, the distribution of students in various fields of study reflects priorities determined by centralized government control rather than, as in the United States, the voluntary choices of individual students.

[27] L. A. Komorov, *Planirovanie Podgotovku i Raspredeleniia Spetsialistov v S.S.S.R.* ("Planning of Training and Distribution of Specialists in the U.S.S.R."), (Moscow: Izdatel'stvo Ekonomicheskoi Literatury, 1961), pp. 28–31.

[28] E. F. Borisov, D. A. Zhidenko, and N. I. Kondakova, "Maksimal'no Ispol'zovat' Vozmozhnosti Aspirantury" ("Utilize Graduate Training to the Maximum"), *Vestnik Vysshei Shkoly* ("Review of Higher School"), Vol. 10, 1961, pp. 71–72.

[29] Topchiev, *op. cit.*, p. 43.